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THE CORRELATION OF X-RAY FINDINGS AND  
PHYSICAL SIGNS IN THE CHEST IN UNCOM-  
PLICATED EPIDEMIC INFLUENZA

By ARTHUR L. BLOOMFIELD and CHARLES A. WATERS

*(From the Medical Clinic and the X-Ray Department of The Johns  
Hopkins Hospital)*





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The exact significance of the pulmonary lesions associated [252]  
with epidemic influenza is still a disputed question. In a  
recent report<sup>1</sup> the view was expressed that bronchopneumonia,  
although occurring frequently along with or following influ-  
enza, was not an essential feature of the disease, but a com-  
plication. This opinion was based on the study of an epidemic  
of severe cases most of which ran their course without demon-  
strable pulmonary involvement. It seemed possible, however,  
that small areas of pneumonia might exist even without cough,  
sputum, or physical signs, especially in the cases in which fever  
persisted for more than three or four days. The present study  
was undertaken to see what light roentgenographic examina-  
tions would throw on this question.

The material consisted of 16 consecutive cases of uncom-  
plicated epidemic influenza treated in the wards of The Johns  
Hopkins Hospital during January and February, 1919. The  
diagnosis was based on the symptoms, the hyperæmic phe-  
nomena of skin and mucous membranes, the course of the  
disease, the duration of the fever, and the presence of leuco-  
penia. In no case was there any evidence of pulmonary com-  
plications—the lungs remained clear throughout on physical  
examination, and cough, if present, was dry and productive  
only of the usual slight mucoid expectoration associated with  
the hyperæmia of the mucosa of the upper respiratory tract.

<sup>1</sup> Bloomfield A. L. and Harrop, G. A., Jr.: Bull. J. H. H., 1919,  
XXX, 1.

TABLE I  
COMPARISON OF CLINICAL AND ROENTGENOGRAPHIC EXAMINATION OF THE CHEST IN UNCOMPLICATED CASES OF  
EPIDEMIC INFLUENZA

Name	Date of examination	Day of disease	Temperature F.	Physical signs	Cough	Sputum	Day on which became normal	Roentgenograms
V. A.	January 22	4	104°	Normal	Slight, dry	0	5	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 24	6	Normal	"	"	0	"	"
	" 27	9	"	"	"	0	"	"
M. A.	January 22	4	102°	Normal	Slight, dry	Slight, mucoid	8	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Consolidated glands (?) at root of right lung. Pulmonary field shadows remain unchanged.
	" 24	6	101°	"	"	"	"	"
	" 27	9	Normal	"	"	0	"	"
A. . . . .	January 21	4	104°	Normal	Slight, dry	0	9	No signs of consolidation. Marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 23	6	103°	"	"	0	"	"
	" 25	8	102°	"	"	0	"	"
	" 27	10	Normal	"	"	0	"	"
	" 29	12	"	"	"	0	"	"
	February 1	15	"	"	"	0	"	"
W. . . . .	February 11	4	104°	Normal	Slight	Slight, mucoid	6	No signs of consolidation. Very marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 12	5	100°	"	"	"	"	"
	" 14	7	Normal	"	"	0	"	"
	" 17	10	"	"	"	0	"	"
	" 20	13	"	"	"	0	"	"
N. B.	February 10	4	101°	Normal	Slight	Slight, mucoid	9	No signs of consolidation. Marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 12	6	100°	"	"	"	"	"
	" 14	9	100°	"	"	"	"	"
	" 17	12	Normal	"	"	"	"	"
	" 20	15	"	"	"	0	"	"
S. C. . . . .	February 11	3	101°	Normal	Slight, dry	0	6	No signs of consolidation. Marked root shadows on both sides. Slight clouding of right apex. Bases clear. Pulmonary field shadows remain unchanged.
	" 13	5	101°	"	"	0	"	"
	" 17	9	Normal	"	"	0	"	"
	" 20	12	102°	Normal	Slight, dry	0	9	No signs of consolidation. "Very marked root shadows on both sides. Calcified glands (?) in left root. Apices clear. Bases clear.
D. . . . .	February 5	8		Normal				
J. . . . .	February 4	4	101°	Normal	Slight	Moderate mucopurulent	8	Pulmonary field shadows remain unchanged.
	" 6	6	103°	"	"	"	"	"
	" 8	8	Normal	"	"	"	"	"
C. . . . .	February 11	4	102°	Normal	Slight, dry	0	8	No signs of consolidation. Very marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 13	6	101°	"	"	0	"	"
	" 15	8	Normal	"	"	0	"	"
	" 17	10	102°	Normal	"	0	5	No signs of consolidation. Very marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
S. . . . .	February 15	4		Normal				
	" 18	7	Normal	"	"	0	6	No signs of consolidation. Marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
F. B.	February 12	13	100°	Normal	"	0	4	No signs of consolidation. Marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 14	8	Normal	"	"	0	"	"
	" 17	11	100°	Normal	"	0	4	No signs of consolidation. Marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
W. L.	February 10	3	Normal	"	"	0	5	No signs of consolidation. Moderately marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 12	5	Normal	"	"	0	"	"
	" 14	7	101°	Normal	"	0	5	No signs of consolidation. Moderately marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
M. L.	February 8	4	Normal	"	"	0	5	No signs of consolidation. Moderately marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 10	6	Normal	"	"	0	"	"
	" 12	8	102°	Normal	Slight	0	5	No signs of consolidation. Moderately marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
G. . . . .	January 25	4	Normal	"	"	0	4	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 27	6	Normal	"	"	0	"	"
	" 29	8	100°	Normal	"	0	4	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
P. . . . .	February 1	4	Normal	"	"	0	6	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 3	6	Normal	"	"	0	"	"
	" 5	8	102°	Normal	"	0	6	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
W. A.	February 1	4	Normal	"	"	0	6	No signs of consolidation. Well marked root shadows on both sides. Apices clear. Bases clear. Pulmonary field shadows remain unchanged.
	" 3	6	Normal	"	"	0	"	"
	" 5	8	"	"	"	0	"	"

[254] Roentgenographic examination of the chest was made as soon as possible after admission and thereafter at two- or three-day intervals until the patient was discharged. Each series of plates was studied with two points in mind—first to discover and interpret any abnormal markings, and secondly, to determine any variations in the pulmonary shadows during the course of the disease.

#### RESULTS

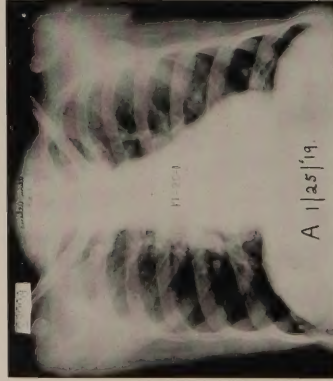
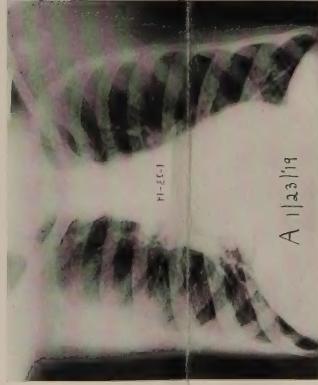
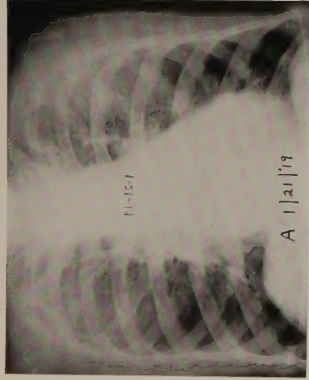
The results of the examinations are summarized in Table I. In no case was there any detectable change in the appearance of the lung markings in a series of from three to six plates made at various times during the febrile and post-febrile convalescent stages of the disease. It would seem, therefore, that the markings were permanent or at least unassociated with the immediate acute disease. In no case was any shadow seen which could be interpreted as indicating a solidification of the lung. The usual grades of root shadows, in some cases small areas of probable calcification (glands ?) resulting from infections prior to the influenza, and in others slight degrees of apical clouding were seen. It is not the present purpose to discuss the exact significance of pulmonary shadows in general.

#### CONCLUSIONS

1. Repeated roentgenographic examinations of the lungs during the course of clinically uncomplicated cases of epidemic influenza showed only permanent lung markings.
2. These findings support the clinical impression that bronchopneumonia is a complication and not an essential feature of the disease.





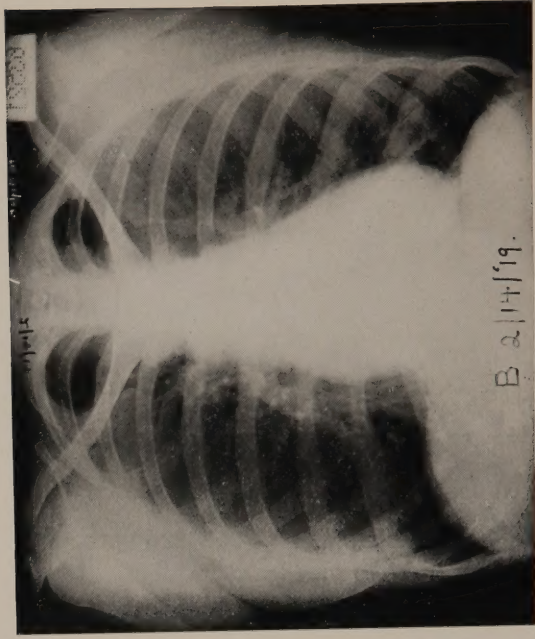
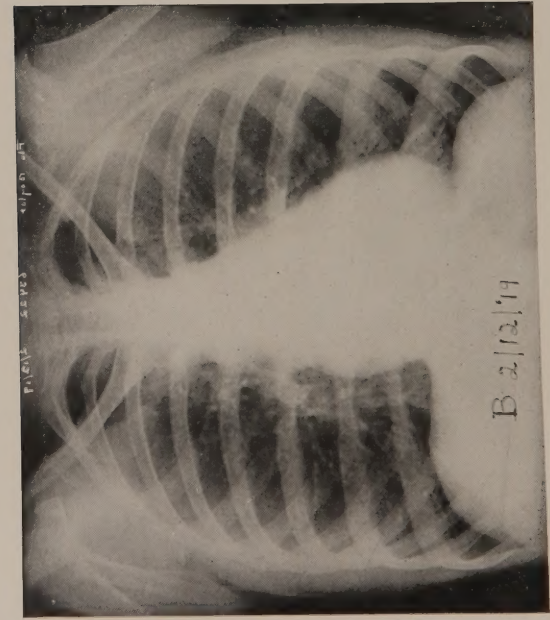


SERIES OF PLATES FROM CASE A.









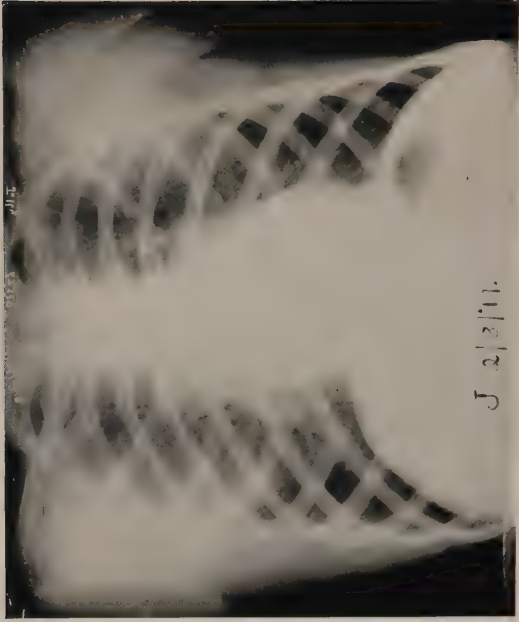
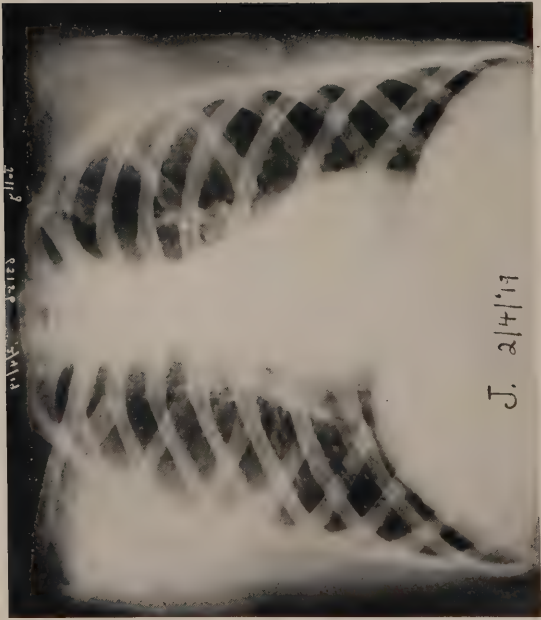


SERIES OF PLATES FROM CASE B.

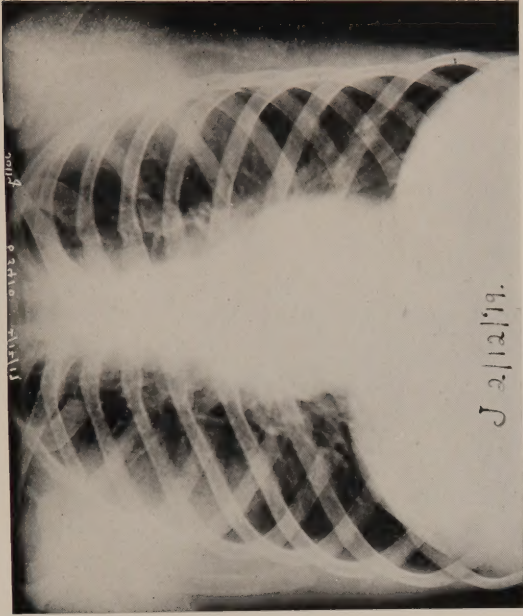
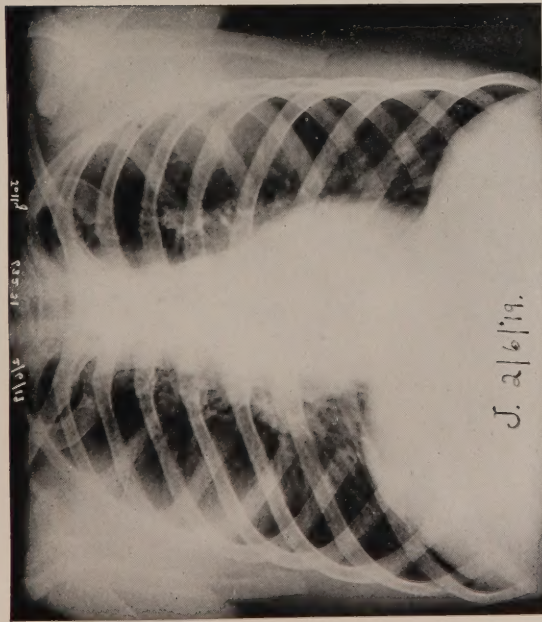












SERIES OF PLATES FROM CASE J.



